

Bid Opportunity 839-2012	BRRMF L&YW AND PILOT BIOSOLIDS COMPOSTING	Page 1 of 8
REVISION 0	SECTION 14551 BELT CONVEYOR SYSTEM	

PART 1. GENERAL

1.1 WORK OF THIS SECTION

- A. The Work of this Section includes furnishing and installation of belt conveyor systems, motors, frames, instruments and control devices, accessories and all appurtenant Work as specified in these Contract Documents.
- B. Unit Responsibility:
1. The Work requires that the belt conveyor systems, and accessories including, but not necessarily limited to, electric motors, frames, instruments and control devices, and accessories be the end product of one responsible system supplier.
 2. The Contractor shall furnish all components and accessories of the system to enhance compatibility, ease of operation and maintenance, and as necessary to place the equipment in operation in conformance with the specified performance, features and functions without alterations or modifications. The Contractor is responsible to the City for providing the equipment system as specified herein.

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. American Bearing Manufacturers' Association (ABMA): 11, Load Ratings and Fatigue Life for Roller Bearings.
 2. American Gear Manufacturers Association (AGMA).
 3. American Iron and Steel Institute (AISI).
 4. ASTM International (ASTM):
 - a. A36/A36M, Standard Specification for Carbon Structural Steel.
 - b. A167, Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
 - c. A325, Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength Standard.
 5. Conveyor Equipment Manufacturers Association (CEMA): Belt Conveyors for Bulk Material.
 6. National Electric Manufacturers Association (NEMA): MG 1, Motors and Generators.
 7. Underwriters Laboratory (UL): 674, Electric Motors and Generators for Use in Division 1 Hazardous (Classified) Locations.

1.02 RELATED SECTIONS

- A. Section 13390, Package Control Systems.
- B. 09900, Painting.

Bid Opportunity 839-2012	BRRMF L&YW AND PILOT BIOSOLIDS COMPOSTING	Page 2 of 8
REVISION 0	SECTION 14551 BELT CONVEYOR SYSTEM	

- C. 16050, Basic Electrical Materials.
- D. Section 16220, Low Voltage AC Induction Motors.
- E. Section 14554, Mixer Systems. (Note: Both mixer system and belt conveyor systems to be supplied and warranted by one Vendor.)

1.03 SYSTEM DESCRIPTION

- A. Performance Requirements: Design conveyor system to meet service at less than 60 percent of the conveyor's rated capacity or 25 percent trough filling. Each conveyor drive unit shall be designed for 100 percent of rated capacity.
- B. Material prepared in the Mixing and Receiving Building is required to be conveyed approximately 22 m horizontally and 2.5 m vertically to discharge into an outdoor temporary storage bunker.
- C. The system will consist of two conveyor belts. Conveyor M-1 will transfer material unloaded from the mixing unit north through the wall of the building for a horizontal distance of approximately 6.6 m at an upwards incline of approximately 17 degrees. Conveyor M-1 will discharge onto Conveyor M-2, which will transfer the material east for a horizontal distance of approximately 15 m at an upwards incline of less than 5 degrees.
- D. Control of Conveyors M-1 and M-2 will be integrated into the control panel of the mixing system.

1.04 SUBMITTALS

- A. Action Submittals:
 - 1. Shop Drawings:
 - a. Detail drawings for components of equipment showing all dimensions, parts, construction details, and materials.
 - b. Complete catalog information, descriptive literature, and specifications, for collective system and individual components including motors, power transmission components, belts, pintle pins, tensioners, guards, and instrumentation and control devices.
 - c. Performance specifications of equipment.
 - d. Process schematics associated with equipment.
 - e. Calculations, including:
 - 1) Effective conveyor belt tension, T_e , pound.
 - 2) Conveyor belt horsepower.
 - 3) Maximum conveyor belt unit stress, pound per inch width (PIW).
 - 4) Shaft slope at pulley hub location, radians.
 - 5) L-10 bearing life for head, tail, and snub pulleys.
 - f. Fabricated items, equipment structural supports, platforms, handrails,

Bid Opportunity 839-2012	BRRMF L&YW AND PILOT BIOSOLIDS COMPOSTING	Page 3 of 8
REVISION 0	SECTION 14551 BELT CONVEYOR SYSTEM	

and associated items.

- g. Design loadings, for load combinations, to be transmitted to foundations or supports.
- h. Size, length, and spacing of anchor bolts or attachments to the foundations or supports.
- i. Specific details of attachment of bracing members to concrete or steel structures.
- j. Make, model, weight, and horsepower of each equipment assembly.
- k. Complete motor nameplate data, as defined by NEMA, motor manufacturer, and including any motor modifications.
- l. Power and control wiring diagrams, including terminals and numbers and wiring of field devices.

B. Informational Submittals:

- 1. Manufacturer's test reports.
- 2. Operation and Maintenance Data: As specified in Section 01430, Operation and Maintenance Data.
- 3. Manufacturer's Certificate of Proper Installation, in accordance with Section 01640, Manufacturer's Services.
- 4. List of critical spares.

1.05 QUALITY ASSURANCE

- A. Qualifications: Shop Drawings for conveyor support structures shall be stamped by a registered engineer of the Province of Manitoba, in which conveyor will be installed.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Packing and Shipping: After testing and before dismantling for shipment, matchmark and tag wiring and mechanical connections to ensure proper field assembly.

1.07 EXTRA MATERIALS

- A. Furnish, tag, and box for shipment and storage the following special tools:

Item	Quantity
Special tools required to maintain or dismantle	Two complete sets.

- B. Delivery: In accordance with General Conditions.

Bid Opportunity 839-2012	BRRMF L&YW AND PILOT BIOSOLIDS COMPOSTING	Page 4 of 8
REVISION 0	SECTION 14551 BELT CONVEYOR SYSTEM	

PART 2. PRODUCTS

2.01 BELT CONVEYORS

- A. Performance Requirement: Design conveyor system to meet service as indicated. Design the conveyor based on CEMA Standard.

2.02 SERVICE CONDITIONS

- A. Material Conveyed: Dewatered biosolids and shredded wood amendment mixture.
- B. Size Distribution: 1 cm to 15 cm particles including splintered wood chips up to 15 cm in length and 2 cm in diameter.
- C. Bulk Density: 600 kg/m³
- D. Moisture, Percent/Weight: 55 to 62 percent.
- E. Capacity: 5 m³ per minute.
- F. Continuous Use.
- G. Running Hours/Day: 6
- H. Belt Width: 1.2 m
- I. Belt Speed: To be submitted with calculations.
- J. Location: Outside.
- K. Ambient Temperatures: 40° to minus 45°C.

2.03 COMPONENTS

- A. Frame:
1. Material: 316 Stainless Steel
 2. Type: 20-inch deep truss with angle or channel top and bottom chords, angle lattice, and cross bracing.
- B. Head Section:
1. Furnish a 400 mm (16-inch) diameter, 1.2-m-wide welded steel drum type head pulley, complete with lagging.
 2. Support pulley shaft in pillow block bearings spaced at minimal distance to clear the running belt.
 3. Furnish a belt cleaner at the underside of the head pulley to remove adhering material.
 4. Furnish spring or counterweighted belt cleaner on a channel or truss frame, for connection to the intermediate section of conveyor.
- C. Tail Section:

Bid Opportunity 839-2012	BRRMF L&YW AND PILOT BIOSOLIDS COMPOSTING	Page 5 of 8
REVISION 0	SECTION 14551 BELT CONVEYOR SYSTEM	

1. Furnish a 300 mm (12-inch) diameter, 1.2-m-wide welded steel wing type tail pulley.
2. Support pulley shaft in pillow block bearings spaced at minimal distance to clear the running belt.
3. Furnish two feed-point troughing transition idlers, assembled and mounted on a channel or truss frame, for connection to the intermediate section of conveyor.

D. Idlers:

1. Carrying Idlers: 100 mm (4-inch), 20-degree, equal length, CEMA C roll diameter, 100 mm (4-inch) steel rolls with factory-sealed bearings.
2. Return Idlers: 100 mm (4-inch) flat conventional CEMA C roll diameter, 100 mm (4-inch) rolls, with factory-sealed bearings.

E. Belt (Minimum Criteria):

1. Oil-resistant material.
2. 1.2-m-wide, multiple ply rated at 220 piw (pounds per inch width).
3. Top Cover: 3/16 inches.
4. Bottom Cover: 1/16 inches.
5. Service: Conventional.
6. Splice: Mechanical fastener.

F. Skirtboards:

1. Fabricate from 10-gauge minimal thickness, ASTM A167 Type 304 stainless steel plate.
2. The spacing shall not exceed 2/3 belt width.
3. Set skirtboard length at 2 feet per 100 fpm belt speed, but not less than three times the belt width.
4. Attach to the conveyor support frame and terminate over an idler.

G. Drive Assembly:

1. Single drive, located at the head end.
2. Furnish OSHA coupling, belt, and chain guards.

H. Gear Reducer:

1. Shaft mounted, with a V-belt drive.
2. Gear housing shall provide complete protection under service conditions.
3. Gears: Manufactured to meet the requirements of AGMA Standards and rated Class II operation.
4. Lubrication: By splash as a minimum. Furnish with oil heater.
5. Furnish internally located and lubricated backstops.

I. Shafts: Size shafts to ensure a bending deflection at the pulley end disc of no greater than 8 minutes.

1. Drive and Tail Shafts:
 - a. AISI Steel Grade Designation: 1040.

Bid Opportunity 839-2012	BRRMF L&YW AND PILOT BIOSOLIDS COMPOSTING	Page 6 of 8
REVISION 0	SECTION 14551 BELT CONVEYOR SYSTEM	

- b. Select the heat treatment process (such as, normalize, anneal, 400-degree quench and temper, or 800-degree quench and temper) that will result in a minimum yield tensile strength as required for the calculated shaft loads.
 - c. Accurately grind and fit with key seats, as required.
 - d. Stepdown diameters will not be acceptable without prior approval.
- J. Bearings:
 - 1. Self-aligning, antifriction type, mounted in malleable iron housings, and fitted with taper-locking hubs.
 - 2. Meet ABMA Standards with an L-10 life rating of 100,000 hours.
 - 3. One bearing on each shaft shall float to compensate for shaft expansion.
 - 4. Bearing seals shall prevent the ingress of water and dust.
- K. Take-up: Tail pulley, manually adjusted screw type.
 - 1. Minimum Take-up Length: 3 percent of the total belt length.
- L. Covers:
 - 1. Furnish aluminum 22 gauge full-style weather protection covers for the exposed length of the conveyor.
 - 2. Furnish hinged covers with retaining brackets of chains when open and quick-release tiedown clips and brackets when closed.
- M. Emergency Stop Switch: Furnish belt conveyors with an emergency stop system consisting of pull cord switches actuated by a cable system running the full length of both sides of the conveyor.
 - 1. Cables and Supports:
 - a. Orange-colored, plastic-covered steel aircraft cable.
 - b. All cable end fittings and intermediate cable support eyes.
 - c. Cable support eyes every 10 feet.
 - 3. Switches:
 - a. Manually reset after actuation.
- N. Speed Sensor: The tail shaft shall be provided with a speed sensor to detect failure of rotation under power. The speed sensor shall be provided in a cast aluminum housing rated CSA 4X.
- O. Structural Supports:
 - 1. Design conveyor supports and vertical support posts. Material to be Type 316 stainless steel.
 - 2. Conveyor support requirements and locations are to be determined by Vendor. The absence of defined conveyor support locations or support details on drawings shall not relieve the Contractor of the responsibility of providing required conveyor supports.
 - 3. Supports shall not restrict access to other process systems.

Bid Opportunity 839-2012	BRRMF L&YW AND PILOT BIOSOLIDS COMPOSTING	Page 7 of 8
REVISION 0	SECTION 14551 BELT CONVEYOR SYSTEM	

4. Design conveyor structures in conformance with the AISC Manual of Steel Construction, AISC Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings.
5. Limit maximum total deflection to less than 1/300 of span. Brace supports adequately to carry horizontal loads.
6. The flange, webs, legs, or wall thickness of conveyor support framing shall not be less than 1/4 inch. Use tubular steel, pipe, flat bar, or other members that provide a clean design that will minimize dust ledges and pockets.

2.04 ACCESSORIES

- A. Anchor Bolts: Type 316 stainless steel, sized by equipment manufacturer, 1/2-inch minimum diameter.
- B. Lifting Lugs: Provide suitably attached for equipment assemblies and components weighing over 45 kg (100 pounds).

2.05 FABRICATION

- A. Shop fabricate conveyor structural member and supports from structural carbon steel conforming to ASTM A36/A36M. Steel plate shall conform to ASTM A36/A36M or ASTM A283. Bolts shall conform to ASTM 325.
- B. Shop/Factory Finishing: Prepare and prime conveyor steel members, unpainted steel components, and structural supports in accordance with Section 09900, Painting and Coating.

2.06 SOURCE QUALITY CONTROL

- A. Inspect conveyor components for required construction, electrical connection, and intended function.
- B. Factory Tests and Adjustments: Assemble and perform no-load running tests of the conveyor drive system at manufacturer's plant before shipment.

PART 3. EXECUTION

3.01 INSTALLATION

- A. Install equipment in accordance with the manufacturer's installation instructions.
- B. Following installation, protect materials and equipment from corrosion, physical damage, and the effects of moisture.

3.02 FIELD FINISHING

- A. Conveyor and Supports: As specified in Section 09900, Painting and Coating.

Bid Opportunity 839-2012	BRRMF L&YW AND PILOT BIOSOLIDS COMPOSTING	Page 8 of 8
REVISION 0	SECTION 14551 BELT CONVEYOR SYSTEM	

- B. Following installation, touch up scratches, scrapes, or chips in interior and exterior surfaces of devices and equipment with finishes matching as nearly as possible the type, color, and consistency, and type of surface of the original shop/factory finish.

3.03 FIELD QUALITY CONTROL

- A. Functional Tests:
 - 1. Alignment: Prior to facility startup, test complete assemblies for correct rotation, proper alignment and connection, quiet operation, and satisfactory specified performance.
- B. Performance Test:
 - 1. Conduct on each conveyor.
 - 2. Perform under actual or approved simulated operating conditions.
 - 3. Test for a continuous period during which ten (10) complete batches of material are unloaded from the mixer without disruption or spillage.
 - 4. Coordinate test with Mixer System to deliver designed operating conditions without spill or impact with upstream mixer and mixer skirting.

3.04 MANUFACTURER'S SERVICES

- A. Manufacturer's Representative: Present at Site or classroom designated for installation assistance, inspection, field test, startup and Site training.
 - 1. Mixer Manufacturer's Representative shall be present during 2 person-day, same day, for both mixer and conveyor system for each shift. To be coordinated between Manufacturers by Vendor and Contractor.
 - 2. Number of shifts: 2.
- B. See Section 01640, Manufacturers' Field Services and Section 01810, Equipment Testing and Facility Startup.
- C. Telephone technical support for one-year period following Substantial Performance.

3.05 SUPPLEMENTS

- A. The supplements listed below, following "End of Section," are a part of this Specification.
 - 1. Data Sheets: Motors.

END OF SECTION

Bid Opportunity 839-2012	BRRMF L&YW AND PILOT BIOSOLIDS COMPOSTING	Page 1 of 2
REVISION 0	SECTION 14551-01 CONVEYOR BELT INDUCTION MOTOR DATA SHEET	

Equipment Name: Conveyor Belt Motor

Equipment Tag Number(s): M-1

Type: Squirrel-cage induction meeting requirements of NEMA MG 1

Manufacturer: For multiple units of the same type of equipment, furnish motors and accessories of a single manufacturer.

Motor Horsepower: 20 HP Guaranteed Minimum Efficiency at Full Load: 91 percent

Voltage: 575 V Guaranteed Minimum Power Factor at Full Load: _____ percent

Phase: 3 Service Factor (@ rated max. amb. temp.): 1.0 1.15

Frequency: 60 Hz Enclosure Type: TEFC

Synchronous Speed: _____ rpm Multispeed, Two-Speed: _____ / _____ rpm

Thermal Protection: _____ Winding: One Two

Space Heater: _____ volts, Mounting Type: Horizontal Vertical

single-phase

Vertical Shaft: Solid Hollow

Vertical Thrust Capacity (lb): Up ___ Down _____

Adjustable Speed Drive: See Section 16481, Low-Voltage Adjustable Frequency Drive System.

Operating Speed Range: _____ to _____ % of Rated Speed

Variable Torque

Constant Torque

Additional Motor Requirements: See Section 16220, Low Voltage AC Induction Motors.

Special Features:

Bid Opportunity 839-2012	BRRMF L&YW AND PILOT BIOSOLIDS COMPOSTING	Page 2 of 2
REVISION 0	SECTION 14551-01 CONVEYOR BELT INDUCTION MOTOR DATA SHEET	

Equipment Name: Conveyor Belt Motor	
Equipment Tag Number(s): M-2	
Type: Squirrel-cage induction meeting requirements of NEMA MG 1	
Manufacturer: For multiple units of the same type of equipment, furnish motors and accessories of a single manufacturer.	
Motor Horsepower: <u>20 HP</u>	Guaranteed Minimum Efficiency at Full Load: <u>91</u> percent
Voltage: <u>575 V</u>	Guaranteed Minimum Power Factor at Full Load: _____ percent
Phase: <u>3</u>	Service Factor (@ rated max. amb. temp.): <input type="checkbox"/> 1.0 <input checked="" type="checkbox"/> 1.15
Frequency: <u>60 Hz</u>	Enclosure Type: <u>TEFC</u>
Synchronous Speed: _____ rpm	<input type="checkbox"/> Multispeed, Two-Speed: _____ / _____ rpm
<input type="checkbox"/> Thermal Protection: _____	Winding: <input type="checkbox"/> One <input type="checkbox"/> Two
<input type="checkbox"/> Space Heater: _____ volts, single-phase	Mounting Type: <input type="checkbox"/> Horizontal <input type="checkbox"/> Vertical
	<input type="checkbox"/> Vertical Shaft: <input type="checkbox"/> Solid <input type="checkbox"/> Hollow
	<input type="checkbox"/> Vertical Thrust Capacity (lb): Up ___ Down _____
	<input type="checkbox"/> Adjustable Speed Drive: See Section 16481, Low-Voltage Adjustable Frequency Drive System.
	Operating Speed Range: _____ to _____% of Rated Speed
	<input type="checkbox"/> Variable Torque
	<input type="checkbox"/> Constant Torque
Additional Motor Requirements: <input checked="" type="checkbox"/> See Section 16220, Low Voltage AC Induction Motors.	
Special Features:	

Bid Opportunity 839-2012	BRRMF L&YW AND PILOT BIOSOLIDS COMPOSTING	Page 1 of 6
REVISION 0	SECTION 14554 MIXER SYSTEMS	

PART 1. GENERAL

1.01 REFERENCES

- A. The following is a list of standards that may be referenced in this section:
1. American Bearing Manufacturers' Association (ABMA): 11, Load Ratings and Fatigue Life for Roller Bearings.
 2. American Gear Manufacturers Association (AGMA).
 3. American Iron and Steel Institute (AISI).
 4. ASTM International (ASTM):
 - a. A36, Standard Specification for Structural Steel.
 - b. A167, Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
 - c. A325, Standard Specification for High-Strength Bolts for Structural Steel Joints.
 5. Conveyor Equipment Manufacturers Association (CEMA):
 - a. Standard No. 502.
 - b. Publication, "Belt Conveyors for Bulk Material"
 6. National Electric Manufacturers Association (NEMA): MG 1, Motors and Generators.

1.02 RELATED SECTIONS

- A. Section 13390, Package Control Systems.
- B. Section 14551, Belt Conveyor Systems. **(Note: Both mixer and belt conveyor systems to be supplied and warranted by one vendor.)**
- C. Section 16220, Low Voltage AC Induction Motors..
- D. Section 09900, Painting.

1.03 SUBMITTALS

- A. Action Submittals:
1. Shop Drawings:
 - a. Detail drawings and specifications for components of equipment showing all dimensions, parts, construction details, and materials.
 - b. Performance specifications of equipment.
 - c. Process schematics associated with equipment.
 - d. Standard operating procedures.
 - e. Jamb removal and troubleshooting guidance.
 - f. Standard lubrication requirements.
 - g. Calculations, including:

Bid Opportunity 839-2012	BRRMF L&YW AND PILOT BIOSOLIDS COMPOSTING	Page 2 of 6
REVISION 0	SECTION 14554 MIXER SYSTEMS	

- 1) Working horsepower.
 - 2) Discharge conveyor speed, depth, discharge height from anchor bolt elevation.
 - 3) Height of top of hopper gunwale from anchor bolt elevation (datum).
 - 4) Anchorage details.
- h. Fabricated items, equipment structural supports, platforms, handrails, and associated items.
 - i. Design calculations for items covered by these Shop Drawings. Calculations shall show design stresses in structural members and connections for loading combinations. Seal the calculation of the structural member calculations by a professional engineer licensed in the Province of Manitoba.
 - j. Design loadings, for load combinations, to be transmitted to foundations or supports.
 - k. Size, length, and spacing of anchor bolts or attachments to the foundations or supports.
 - l. Specific details of attachment of bracing members to concrete or steel structures.
 - m. Seal the structural shop drawings by a professional engineer licensed in the Province of Manitoba.
 - n. Wiring and control schematics, details of the control panels including panel layout, bill of materials terminals and numbers.

B. Informational Submittals:

1. Manufacturer's test reports.
2. Manufacturer's Certificate of Proper Installation.
3. Installation Instructions.
4. Operation and Maintenance Data.
5. Critical spare list.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Packing and Shipping: After testing and before dismantling for shipment, matchmark and tag wiring and mechanical connections to ensure proper field assembly.
- B. Delivery: In accordance with Section 01600, Material and Equipment.

PART 2. PRODUCTS

2.01 MIXERS

- A. General: Mixer specification and related field components such as electric power supply are based on the manufacturer and model listed in item L.1. If another manufacturer's products are used, modification to dimensions and power supply etc. may be required to suit. Feed rate, volumetric capacity, and transfer efficiency must be equal for any

Bid Opportunity 839-2012	BRRMF L&YW AND PILOT BIOSOLIDS COMPOSTING	Page 3 of 6
REVISION 0	SECTION 14554 MIXER SYSTEMS	

alternative design. Provide a complete and fully functioning system. Where modifications are required, the modifications shall be the responsibility of the Contractor and included in the lump Sum Price at no extra cost to the City.

- B. The mixer shall consist of a oval shape-mixing tub with a minimum 16 m³ capacity, containing two vertically oriented blending augers. Augers have a variable rotation speed. Mixing occurs by lifting action of augers. Mixing shall be achieved in 3 to 5 minutes. Materials are unloaded through a slide door at the end of the tub. The mixing tub shall have a clean-out hatch in its side situated at the same level as the mixing tub floor and aligned with the front auger.
- C. Design Requirements:
1. Capable of conveying mixture at a rate of 10 batch loads per hour.
 2. Capable of eliminating all sludge balls over 50 mm in diameter at 10 batches per hour.
 3. Density of mixed material is approximately 600 kg/m³.
 4. Mix components consist of sludge at 22 to 28 percent total solids with a density of 1000 kg/m³; and wood amendments with a density of 150 to 260 kg/m³.
 5. Size Distribution of Mix Components: 1 cm to 15 cm particles including splintered chips up to 15 cm long and 5 cm in diameter.
 6. Use: Continuous.
 7. Running Hours/Day: 6.
 8. Mixer Volume: 16 m³.
 9. Mixing Working Capacity: 14 m³ per batch
 10. Number of Mixers: 1.
- D. Mixing Tub:
1. Mixer side and floor material is to be A-36 carbon steel lined with 12 gauge, Type 304 stainless steel. Support members, shields, undercarriage, etc., are to be made of A-36 carbon steel. All bearings are to be high quality triple lip seal, self-aligning, and greasable. Bearings that are not readily accessible are to be connected to lubrication points with flexible grease tubes. The discharge opening is to be equipped with a hydraulically controlled door that raises vertically.
 2. Unloading time is to be approximately 2-1 /2 minutes.
- E. Electric Drive: Each mixer shall be powered by a 150 hp, 600 volt, 3-phase electric motor. A control package, consisting of a TEFC motor, a NEMA 4 steel enclosure, fusible main disconnects, magnetic starter with overloads, control transformer with fused primary and secondary, power supply for scale, remote control pane l with dust-tight buttons, and complete mounting on the unit shall be included.
- F. Discharge Skirting: Discharge skirting will be used to direct material through the slide door onto 1.2 m wide conveyor. Transfer to belt conveyor is to be coordinated with conveyor manufacturer for arrangement so that transfer to load conveyor occurs uniformly in center of conveyor trough with minimal (less than 1 percent) spillage. Discharge skirt shall facilitate the transfer of mixed so lids onto an inclined 1.2 m wide

Bid Opportunity 839-2012	BRRMF L&YW AND PILOT BIOSOLIDS COMPOSTING	Page 4 of 6
REVISION 0	SECTION 14554 MIXER SYSTEMS	

conveyor belt without spillage at all feed rates.

- G. Finish: The base coat shall be a rust inhibitive zinc oxide primer. The finish coat shall be acrylic enamel. Standard color is blue.
- H. Controls and Accessories:
1. Electronic Scale: A digital scale with 4-point load cell mounts shall be supplied which offers capacities to 10,000 kg and accuracies of one quarter of one percent. Display is to be minimum 5 cm high.
 2. A radio controller to be provided to open and close the slide door to allow transfer of mixing tub contents onto the belt conveyor.
 3. Provide exterior ladder for inspection of mixing tub interior.
- I. Control Panels (UCP-1A and UCP-2A):
1. NEMA 4X painted steel enclosure, 600 volts, 3-phase.
 2. Mounted on mixing unit frame, at opposite end from discharge door.
 3. Control panel shall include:
 - a. 400A main circuit breaker disconnect interlocked with panel door.
 - b. Combination circuit breaker type, NEMA rated motor starters.
 - c. Fused control power transformer, 120V ac. Sized to accommodate all control devices plus 1,500 watts for receptacle.
 - d. HAND/OFF/AUTO selector switch for mixer unloading system.
 - e. START/STOP/AUTO switch for each component.
 - f. Running lights (red).
 - g. Motor failure alarm lights (amber).
 - h. Hydraulic system failure alarm light (amber)
 - i. Terminal strip for interfacing with external wiring.
 - j. Alarm (high temperature, moisture, or high level) beacon located on top of panel.
 - k. System EMERGENCY shutdown push button.
 - l. EMERGENCY alarm with (system shut down due to EMERGENCY button) light (amber)
 - m. Lightning protection.
 - n. Intrinsically safe relays as required for UL validation.
 - o. Alarm silence button.
 - p. 110-volt, duplex GFI outlet, weather-protected, and accessible from outside of panel.
 - q. UL labeled panel.
 - r. See Section 13390, Package Control Systems, for component and wiring requirements.
- J. Electrical:
1. General:
 - a. Provide all necessary electrical components and wiring for a complete, functional system. Electrical components shall be provided in accordance

Bid Opportunity 839-2012	BRRMF L&YW AND PILOT BIOSOLIDS COMPOSTING	Page 5 of 6
REVISION 0	SECTION 14554 MIXER SYSTEMS	

with the requirements of Division 16, Electrical.

- b. Instruments supplied in this section shall be wired by the system supplier to a common terminal junction box. Each conductor shall be terminated on a separate terminal point. Provide separation between analog signals and 120-volt power connections.
2. Wiring: The Drawings and Specifications indicate the anticipated wiring for the equipment provided under this section. If additional wiring is required, or if required wiring does not match what is indicated, the Contractor shall make the necessary modifications to the electrical wiring and documentation as part of the lump sum price. All wiring shall meet the requirements of Section 16120, Wiring, and Canadian Electrical Code. All insulation shall be rated 600 volts, minimum. All low voltage (24V) signals shall be run in twisted, shielded pair cable.

K. Operation Description:

1. Normal operation shall require the mixer/conveyor control panel to be controlled locally using a vendor-supplied control panel.
 - a. Operator shall be able to manually control mixer start and stop, slide door open and close, and conveyor system start and stop.
 - b. Operator shall be able to remotely control slide door open and close.
2. Mixer shall have a large letter display visible by the FEL operator during loading process and shall indicate weight of the material inside the mixer that is readable to -40°C.
3. Interlocks: Mixers shall only be able to discharge contents if discharge conveyor system is operating.
4. When either the conveyor is failed or stopped, mixer motor is overloaded, or hydraulic pump for discharge door is overloaded, or E-STOP button is activated, the FAIL signal shall be delivered to the appropriate control panels and the mixer(s) and/or conveyor shall be stopped automatically.

L. Manufacturer and Model:

1. Supreme International 700T Stationary.
2. Or Contract Administrator approved equal in accordance in B6..

2.02 SOURCE QUALITY CONTROL

- A. Inspect for required construction, electrical connection, and intended function.
- B. Factory Tests and Adjustments: Assemble and perform no-load running tests of the conveyor drive system at manufacturer's plant before shipment.

Bid Opportunity 839-2012	BRRMF L&YW AND PILOT BIOSOLIDS COMPOSTING	Page 6 of 6
REVISION 0	SECTION 14554 MIXER SYSTEMS	

PART 3. EXECUTION

3.01 INSTALLATION

- A. Install equipment in accordance with the manufacturer's installation instructions.
- B. Anchor bolts to concrete floor slab shall be stainless steel.
- C. Following installation, protect materials and equipment from corrosion, physical damage, and the effects of moisture.

3.02 FIELD FINISHING

- A. Conveyor Equipment and Supports: As specified in Section 09900, Painting and Coating.
- B. Following installation, touch up scratches, scrapes, or chips in interior and exterior surfaces of devices and equipment with finishes matching as nearly as possible the type, color, consistency, and type of surface of the original shop/factory finish.

3.03 FIELD QUALITY CONTROL

- A. Functional Tests: Conduct on each conveyor.
 - 1. Alignment: Prior to facility startup, test complete assemblies for correct rotation, proper alignment and connection, quiet operation, and satisfactory specified performance.
- B. Performance Test:
 - 1. Conduct on mixer, related equipment, and conveyor system.
 - 2. Perform under actual or Contract Administrator approved simulated operating conditions.
 - 3. Test for a continuous 2-hour period without malfunction.
 - 4. Coordinate test with conveyor system, using Contractor Administrator approved design conditions, and demonstrate proper mixing of material as specified.

3.04 MANUFACTURER'S SERVICES

- A. Manufacturer's Representative: Present at Site or classroom designated for installation assistance, inspection, field test, startup and Site training.
 - 1. Manufacturer's Representatives shall be present during 2 person-day, same day, for both mixer and conveyor system for each shift. To be coordinated between Manufacturers by Vendor and Contractor.
 - 2. Number of Shifts: 2.
- B. Telephone technical support for one-year period following Substantial Performance.

END OF SECTION